MIDDLE EOCENE AGE OF THE MEGAFOSSIL FLORA AT GOLDEN GROVE, SOUTH AUSTRALIA: PRELIMINARY REPORT, AND COMPARISON WITH THE MASLIN BAY FLORA

A clay lens exposed during mining operations in a Monier Golden Grove sand pit contains abundant remains of leaves, pollen and spores. Evaluation of all the fossils continues but preliminary results of the megafossils are now available[1].

This note presents the preliminary results of a palynological examination of two samples from Golden Grove and two others from the leaf-bearing beds at Maslin Bay[2,3,4,5,6]. The latter samples were examined in order to determine whether the two sites are correlative. A more extensive treatment of the palynofloras from Golden Grove will be given following analyses of borehole samples of the clay lens obtained during a recent drilling programme in the Golden Grove area[7]. Detailed records of the palynofloras are held in the Biostratigraphy Branch, Department of Mines and Energy, South Australia.

All samples produced diverse, well preserved palynofloras in which pollen of *Nothofagidites* spp., *Haloragacidites harrisii* (Couper) Harris 1971, the gymnosperms, the Proteaceae and spores from the cryptogams are very common. No one group, however, is a very dominant part of the assemblage as is usually expected, say, of *Haloragacidites harrisii* and *Nothofagidites* spp. in Tertiary palynofloras. The samples are also rich in their diversity of triporate, tricolpate and tricolporate pollen produced by the angiosperms. One sample from Golden Grove contained an unusually high frequency of tricolporate pollen, in particular that assigned to *Rhoipites sphaerica* (Cookson) Pocknall & Crosbie 1982. In general, however, the composition of the assemblages from each site is similar.

In southern Australia two palynological zones have been erected for the Tertiary in the Gippsland and South Australian areas (Fig. 1). In the Harris zonation, palynofloras from Golden Grove and Maslin Bay can be assigned to the *P. pachypolus* Zone. This determination is made on the basis of the presence of *Nothofagidites asperus* (Cookson) Stover & Evans 1973 and *N. falcatus* (Cookson) Stover & Evans 1973, the first occurrence of which marks the base of the Zone, as well as the common occurrence of the zonal species together with frequent *Nothofagidites* spp. and *Proteacidites* spp., particularly *P. kopiensis* Harris 1972, *P. reticulatus* Cookson 1950 and *P. symphyonemoides* Cookson 1950[8]. *Trilites tuberculiformis* Cookson 1947 and *Matonisporites ornamentalis* (Cookson) Stover & Partridge 1973 are rare, and *Triorites magnificus* Cookson 1950 is absent. The first occurrence of the latter species is used to mark the top of the *P. pachypolus* Zone.

The palynofloras are also correlatives of the lower *Nothofagidites asperus* Zone in the Gippsland sequences (Fig. 1), thus supporting the conclusion drawn above. The base of the Zone is marked by the first appearance of a number of species which are present in the palynofloras including: *Foveotriletes balteus* Partridge 1973, *Gemmatricolporites gestus* Partridge 1973, *Gothanipollis hassensis* Stover 1973, *Nothofagidites asperus* (Cookson) Stover & Evans 1973, *N. falcatus* (Cookson) Stover & Evans 1973, *N. vansteenisi* (Cookson) Stover & Evans 1973, *Periporopollenites vesicus* Partridge 1973, *Rhoipites angurium* (Partridge) Pocknall & Crosbie 1982, *Rugulatisporites trophus* Partridge 1973, *Tricolpites simatus* Partridge 1973, *T. thomasii* Cookson & Pike 1954 and *Tricolporites leuros* Partridge 1973[9,10].

A number of species whose upper range terminates within the lower *N. asperus* Zone are also present including

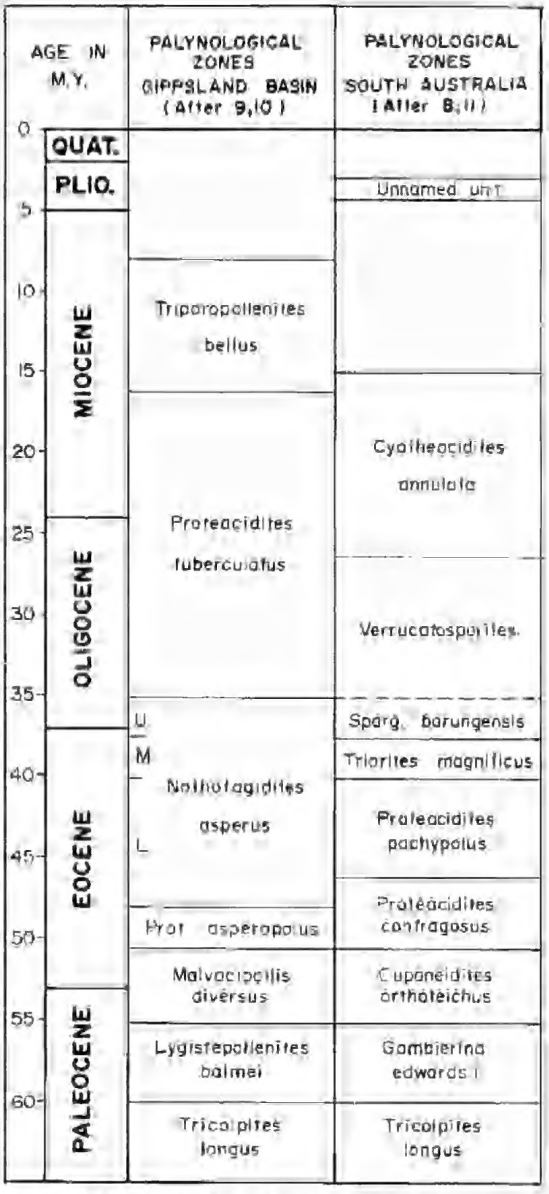

Fig. 1. Tertiary palynological zones in southern Australia.

Anacolosidites acutullus Cookson & Pike 1954, *A. luteoides* Cookson & Pike 1954, *A. sectus* Partridge 1973, *Dryptopollenites semilunatus* Stover 1973, *Proteacidites alveolatus* Stover 1973, *P. asperopolus* Stover & Evans 1973, *P. incurvatus* Cookson 1950, *P. kopiensis* Harris 1972, *P. pachypolus* Cookson & Pike 1954, *P. tenuiexinus* Stover 1973, *Polycolpites reticulatus* Couper 1960, *Rhoipites sphaerica* and *Verrucosisporites cristatus* Partridge 1973.

Palynofloras previously recovered from the Maslin Bay leaf beds were believed to have been correlative with the older *Proteacidites confragosus* Zone, although in the light of later work they were reassigned to the *Proteacidites pachypolus* Zone[6,12]. The data presented in the present note not only support the latter conclusion but also show that the palynofloras from Maslin Bay and Golden Grove are correlative. Thus the Golden Grove and Maslin Bay clay lenses and plant megafossils are Middle Eocene in age, as are the fossil floras from the Maslin Bay site. The palynological zonations and the age determination indicate that the sand deposit at Golden Grove is a correlative of the North Maslin Sands.

The palynofloras found at Golden Grove appear to be more diverse than the macrofloral assemblages[1]. At least 134 taxa can be recognized in the palynoflora, of which 115 can be ascribed to established form genera or species, and a further 19 species of unknown affinity. This is to be expected, however, because the pollen and spores are representative of the regional vegetation and may have been transported considerable distances to the site. The macrofossils, on the other hand, were derived in close proximity to the site of deposition and provide evidence of the local vegetation. Moreover, the sediments in which the macrofossils occur are very finely laminated clay and silt with no current bedding to indicate that the leaves could have been brought from some distance away by streams.

Pollen and spores from a number of plant genera recorded at Golden Grove are well represented in the palynofloras. Proteaceous pollen is common and diverse, including pollen of *Banksia* Linnaeus f. and *Grevillea* R. Brown ex R. A. Salisbury, as is pollen from the family Podocarpaceae, including three species of *Phyllocladus* L. C. Rich, one of *Dacrydium* Solander, three of *Podocarpus* L'Herit ex Pers. and one *Microcachrys* F. Hooker. The Myrtaceae are common and at least four species of pollen can be recognized, including pollen with affinities to *Eucalyptus* L'Herit. Although spores of the cryptogams form only small proportion of the assemblage, they are diverse and include two species of *Lygodium* Linnaeus f. type spores and two others with probable affinities to the genus.

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